

Description

Metal Oxide Varistor (MOV) as one nonlinear resistance element is mainly made of zinc oxide (ZnO), which has very high surge capacity and big nonlinear coefficient. Below the threshold voltage, its resistance is very high, nearly no current flows through, but above the threshold voltage, the resistance reduces sharply, huge current can be discharged. Due to this characteristic, varistor as a protection component in electronic and electrical equipment can absorb abnormal over-voltage and lightning surge.

SETsafe | SETfuse varistor is with High Surge Current Density, Low Clamping Voltage, and Good Surge Capacity. It can also be customized as required.



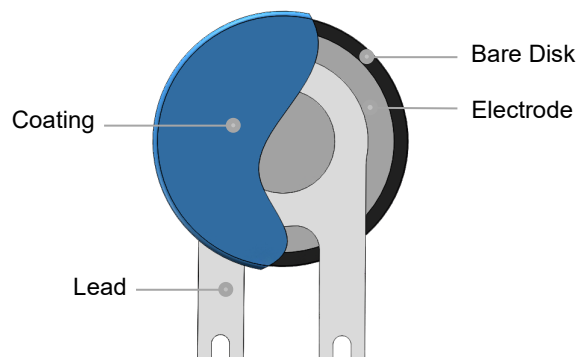
Features

- Epoxy Resin Coating
- Silicone Resin Coating
- Low Leakage Current
- Bidirectional and Symmetrical V/I Characteristics
- RoHS & REACH Compliant
- Operating Temperature Range
Low Temperature: -40 °C
High Temperature: +85 °C

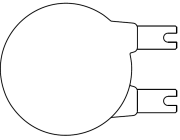
Applications

- Power Supplies
- Home Electrical Appliances
- Industrial Devices
- Surge Protectors
- Telecom Devices

Product Structure



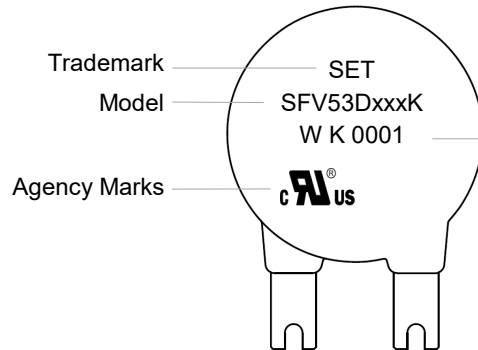
Lead Type

Lead Type		Code
	Straight Strap Lead	E

Agency Approvals

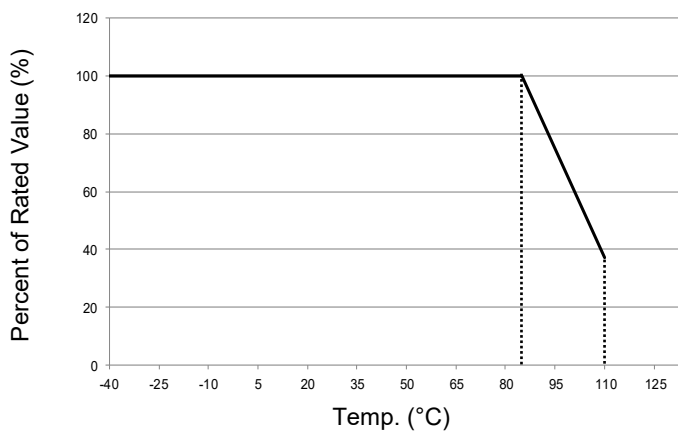
Agency	Standards	No.
	UL 1449 4 th Edition	on request
	CSA C22.2 NO.269.5-17	on request

Marking



Internal code	
Year Code	2000—A
	
	2022—W
Surge Level	K: Standard Type
Serial No.	(E.G.: 0001)

Temp. Derating Curve



Note:

When ambient Temp. exceeds 85 °C, the peak surge current and energy rating should be reduced as shown in left curve.

For Normal Temp. Series

General Technical Data

Item	Value	Unit
Operating Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°C
Voltage Proof	≥2500	V _{ac}
Insulation Resistance	≥100	MΩ

Part Numbering System

SFV 53 D 471 - K N K A BUL - 001

Other Options

*Packaging & Lead Length

BUL: Bulk + Standard Lead Length

Lead Type

E: Straight Strap Lead

Surge Level

K: Standard Type

Operating Temp.

N: Epoxy Coating 85 °C

Voltage Tolerance

K: ±10%

J: ±5%

S: Special Tolerance

Nominal Varistor Voltage

820: $82 \times 10^0 = 82 \text{ V}$

471: $47 \times 10^1 = 470 \text{ V}$

122: $12 \times 10^2 = 1200 \text{ V}$

Disk Shape

D: Round

Bare Disk Dimension

53: 53 mm

Product Category

SETfuse Varistor

*For more details refer to packaging information.

Glossary

Item	Description
V_N	Nominal Varistor Voltage Voltage, at specified D.C. current used as a reference point in the component characteristics.
I_L	Leakage Current Measuring at 75% of varistor voltage.
UCT	Upper Category Temp. Max. ambient temp. for which a varistor has been designed to operate continuously.
LCT	Lower Category Temp. Minimum ambient temp. at which a varistor has been designed to operate continuously.
Max. Peak Current	Max. Peak Current Max. current per pulse, which may be passed by a varistor at an ambient temp. of 25 °C, for a given number of pulses.
V_C	Clamping Voltage Peak voltage developed across the varistor terminations under standard atmospheric conditions, when passing an 8/20 µs class current pulse.
Voltage Proof	Voltage Proof Max. peak voltage, which may be applied under continuous operating conditions between the varistor terminations and any conducting mounting surface (Applicable only to insulated varistors).
C_V	Capacitance Capacitance across the MOV measured at a specified frequency and voltage.
V_{ac}	Max. Continuous a.c. Voltage Max. a.c. r.m.s. voltage of a substantially sinusoidal waveform (less than 5% total harmonic distortion) which can be applied to the component under continuous operating conditions at 25 °C.
V_{dc}	Max. Continuous d.c. Voltage Max. d.c. voltage (with less than 5% ripple) which can be applied to the component under continuous operating conditions at an ambient temp. of 25 °C.

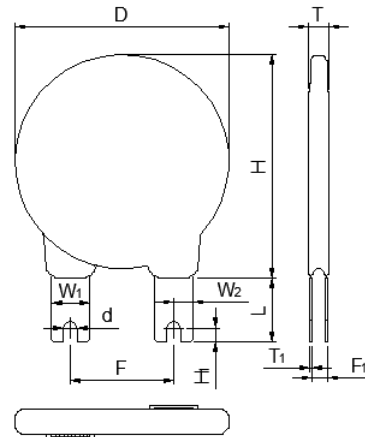
Specification

Model	Max. Continuous Operating Voltage		Varistor Voltage @1 mA dc		Clamping Voltage (Max.)		Max. Discharge Current (8/20 μs)		Max. Energy (10/1000 μs)	Typical Capacitance (For reference only) @1 kHz	Agency Approvals			
	Vac	Vdc	Min.	Max.	V _C	I _P	I _n	I _{max}	(J)	(pF)				
	(V)	(V)	(V)	(V)	(V)	(A)	(kA)	(kA)			UL	cUL	TUV	CQC
SFV53D820K	50	65	74	90	135	500	35	70	185	35000	●	●	○	○
SFV53D101K	60	85	90	110	165	500	35	70	240	28500	●	●	○	○
SFV53D121K	75	100	108	132	200	500	35	70	340	23500	●	●	○	○
SFV53D151K	95	125	135	165	250	500	35	70	430	19000	●	●	○	○
SFV53D181K	115	150	162	198	300	500	35	70	500	17000	●	●	○	○
SFV53D201K	130	170	180	220	340	500	35	70	550	15000	●	●	○	○
SFV53D221K	140	180	198	242	360	500	35	70	600	13750	●	●	○	○
SFV53D241K	150	200	216	264	395	500	35	70	650	12500	●	●	○	○
SFV53D271K	175	225	243	297	455	500	35	70	700	11000	●	●	○	○
SFV53D301K	190	250	270	330	500	500	35	70	765	10000	●	●	○	○
SFV53D331K	210	275	297	363	550	500	35	70	825	9000	●	●	○	○
SFV53D361K	230	300	324	396	595	500	35	70	850	8500	●	●	○	○
SFV53D391K	250	320	351	429	650	500	35	70	885	7500	●	●	○	○
SFV53D431K	275	350	387	473	710	500	35	70	990	7000	●	●	○	○
SFV53D471K	300	385	423	517	775	500	35	70	1080	6500	●	●	○	○
SFV53D511K	320	415	459	561	845	500	35	70	1150	6000	●	●	○	○
SFV53D561K	350	460	504	616	925	500	35	70	1200	5500	●	●	○	○
SFV53D621K	385	505	558	682	1025	500	35	70	1300	5000	●	●	○	○
SFV53D681K	420	560	612	748	1120	500	35	70	1350	4500	●	●	○	○
SFV53D751K	460	615	675	825	1240	500	35	70	1400	4000	●	●	○	○
SFV53D821K	510	670	738	902	1355	500	35	70	1600	3700	●	●	○	○
SFV53D911K	550	745	819	1001	1500	500	35	70	1700	3300	●	●	○	○
SFV53D102K	625	825	900	1100	1650	500	35	70	1890	3000	●	●	○	○
SFV53D112K	680	895	990	1210	1815	500	35	70	2050	2700	●	●	○	○
SFV53D122K	750	990	1080	1320	1980	500	35	70	2160	2500	●	●	○	○

●: Approved

○: Unauthorized

Dimensions (mm)



Model	L (min.)	W ₁	W ₂	H (Max.)	H ₁	T (Max.)	T ₁	D (Max.)	d	F	F ₁
SFV53D820K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	4.3	0.5±0.1	56.5	3.8±0.2	25.4±0.6	0.7 - 2.6
SFV53D101K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	4.5	0.5±0.1	56.5	3.8±0.2	25.4±0.6	0.9 - 2.8
SFV53D121K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	4.7	0.5±0.1	56.5	3.8±0.2	25.4±0.6	1.0 - 3.0
SFV53D151K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	5.1	0.5±0.1	56.5	3.8±0.2	25.4±0.6	1.4 - 3.4
SFV53D181K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	5.4	0.5±0.1	56.5	3.8±0.2	25.4±0.6	1.7 - 3.7
SFV53D201K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	5.6	0.5±0.1	56.5	3.8±0.2	25.4±0.6	1.9 - 3.9
SFV53D221K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	5.8	0.5±0.1	56.5	3.8±0.2	25.4±0.6	2.1 - 4.1
SFV53D241K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	6.1	0.5±0.1	56.5	3.8±0.2	25.4±0.6	2.4 - 4.4
SFV53D271K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	6.4	0.5±0.1	56.5	3.8±0.2	25.4±0.6	2.7 - 4.7
SFV53D301K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	5.2	0.5±0.1	56.5	3.8±0.2	25.4±0.6	1.5 - 3.5
SFV53D331K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	5.4	0.5±0.1	56.5	3.8±0.2	25.4±0.6	1.7 - 3.7
SFV53D361K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	5.6	0.5±0.1	56.5	3.8±0.2	25.4±0.6	1.9 - 3.9
SFV53D391K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	5.8	0.5±0.1	56.5	3.8±0.2	25.4±0.6	2.1 - 4.1
SFV53D431K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	6.1	0.5±0.1	56.5	3.8±0.2	25.4±0.6	2.3 - 4.3
SFV53D471K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	6.4	0.5±0.1	56.5	3.8±0.2	25.4±0.6	2.5 - 4.5
SFV53D511K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	6.6	0.5±0.1	56.5	3.8±0.2	25.4±0.6	2.8 - 4.8
SFV53D561K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	7.0	0.5±0.1	56.5	3.8±0.2	25.4±0.6	3.1 - 5.1
SFV53D621K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	7.4	0.5±0.1	56.5	3.8±0.2	25.4±0.6	3.5 - 5.5
SFV53D681K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	7.8	0.5±0.1	56.5	3.8±0.2	25.4±0.6	3.8 - 5.8
SFV53D751K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	8.2	0.5±0.1	56.5	3.8±0.2	25.4±0.6	4.2 - 6.2
SFV53D821K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	8.7	0.5±0.1	56.5	3.8±0.2	25.4±0.6	4.7 - 6.7
SFV53D911K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	9.3	0.5±0.1	56.5	3.8±0.2	25.4±0.6	5.2 - 7.2
SFV53D102K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	9.9	0.5±0.1	56.5	3.8±0.2	25.4±0.6	5.8 - 7.8
SFV53D112K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	10.6	0.5±0.1	56.5	3.8±0.2	25.4±0.6	6.4 - 8.4
SFV53D122K	16.0	9.7±0.5	4.85±0.10	64.0	3.6±0.3	11.2	0.5±0.1	56.5	3.8±0.2	25.4±0.6	7.0 - 9.0

Note:

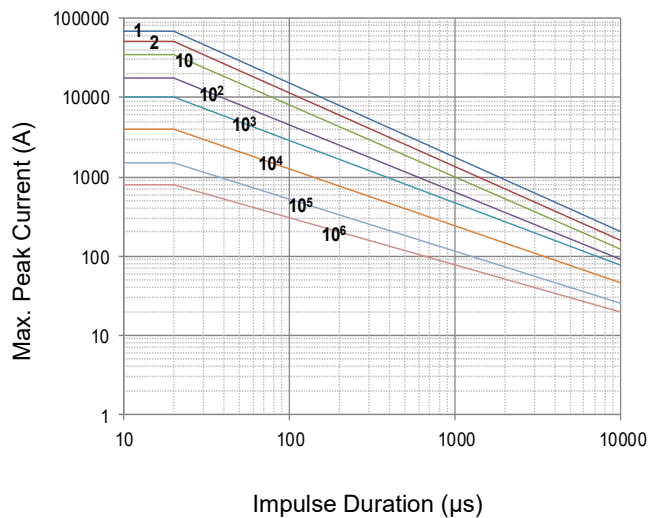
The above data is for reference only.

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E-Mail: sales@alpha-therm.de
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Performance Curve (For reference only)

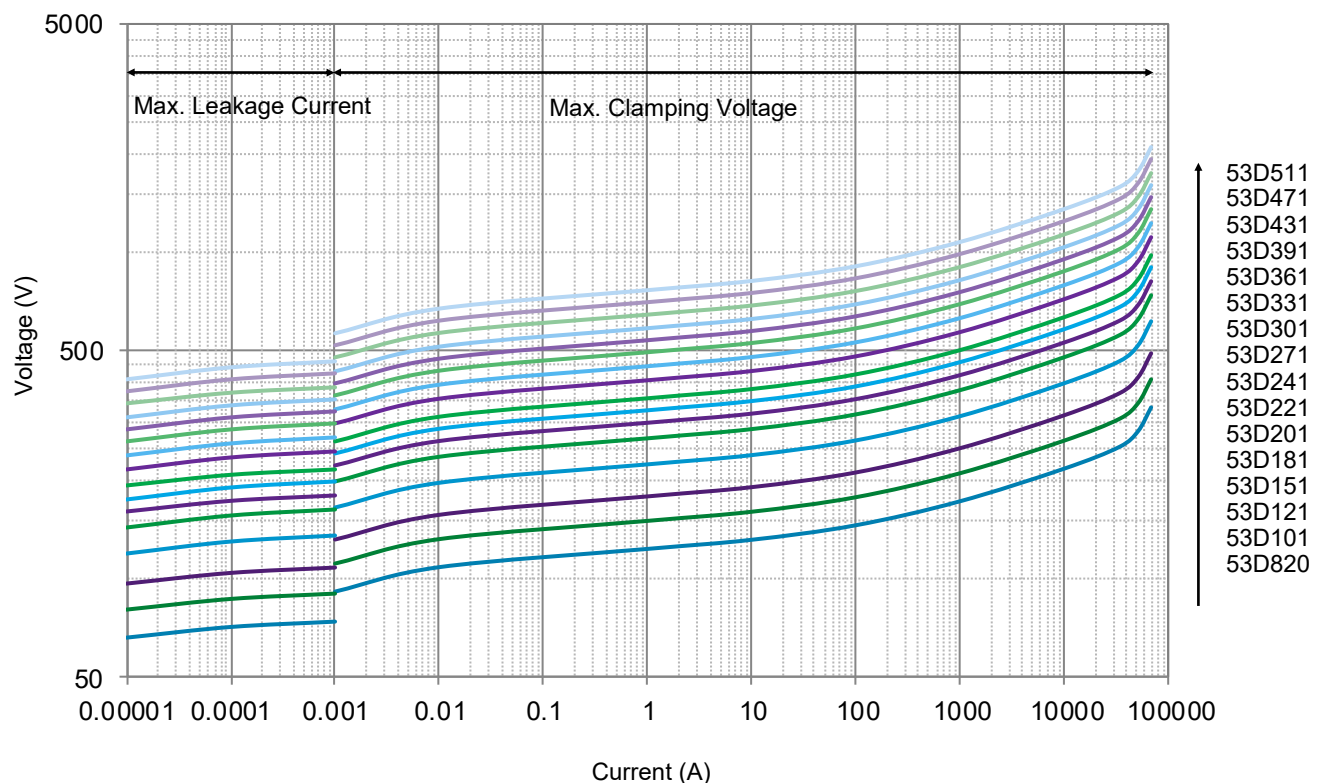
- Max. Peak Current Derating Curves



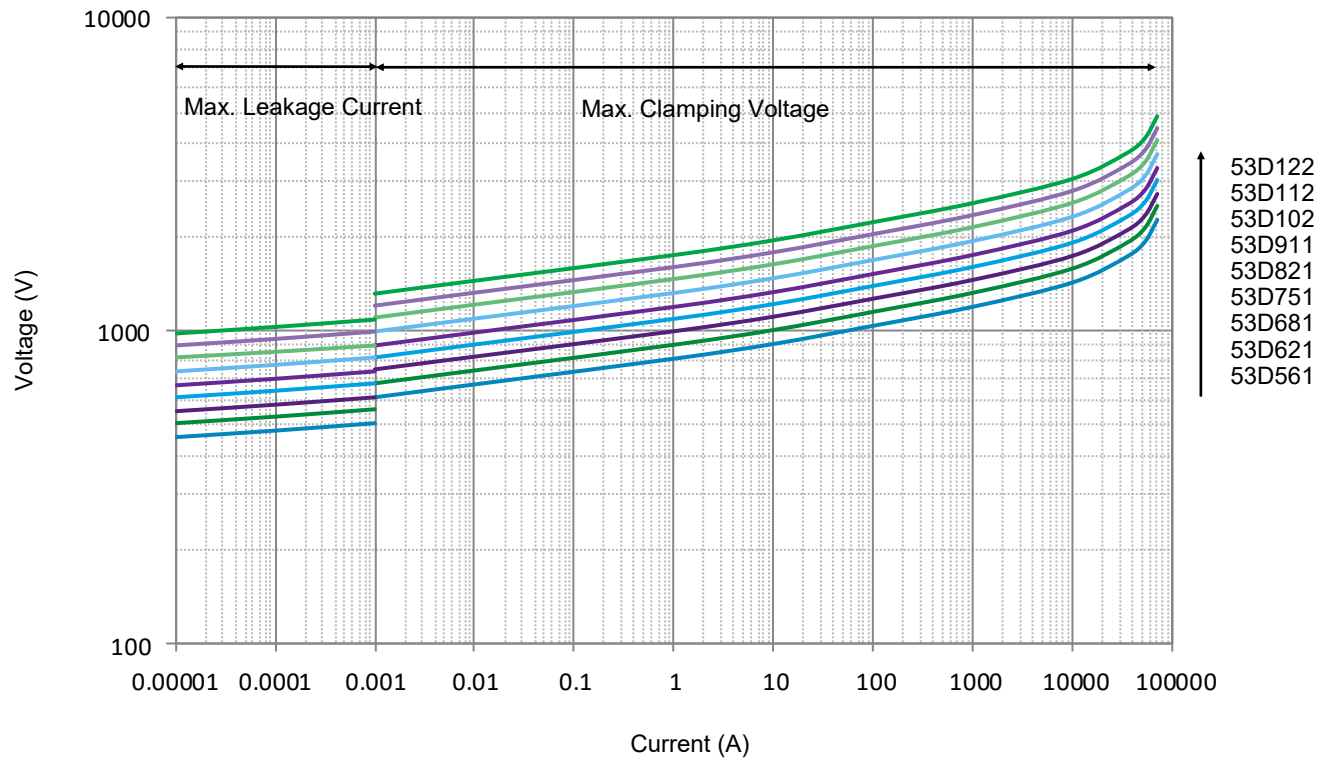
SFV53D820K to SFV53D122K

Note: 1, 2, 10, 10², 10³, 10⁴, 10⁵, 10⁶ Stand for Repetitions

- Voltage-Current Characteristic Curves



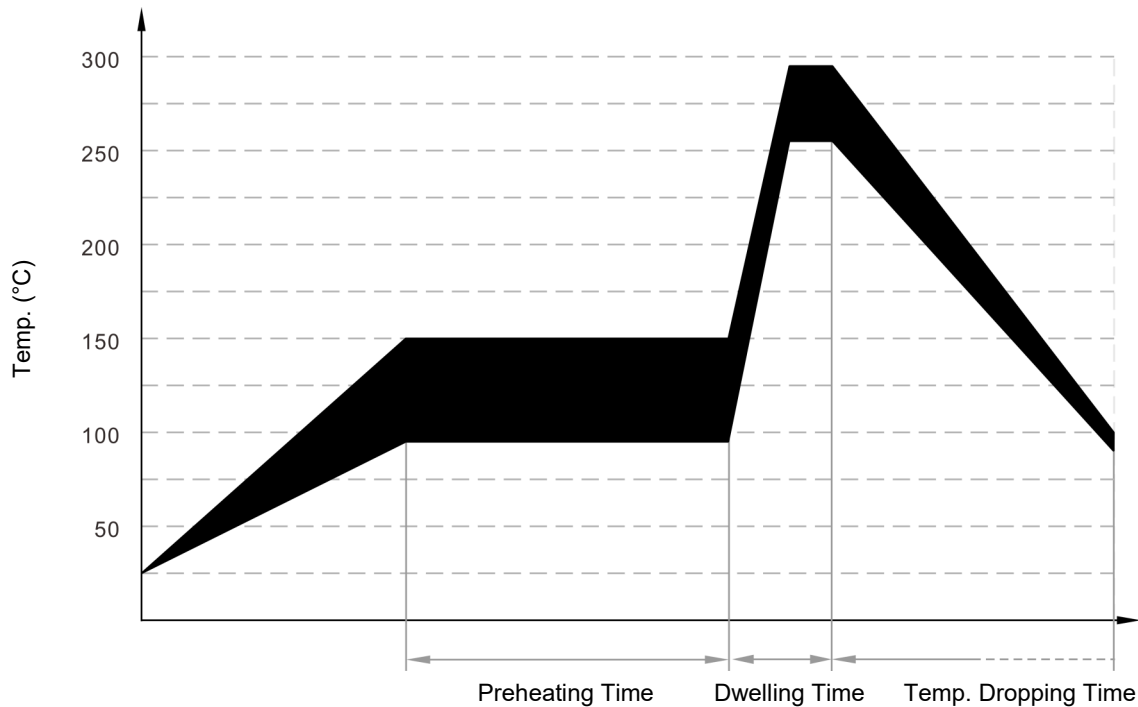
- Voltage-Current Characteristic Curves



Soldering Parameters

Wave Soldering Parameters

The wave soldering parameters are for reference only. When MOV is for practice use, some related validation is recommended.



Wave Soldering Curve

Item	Temp. (°C)	Time (s)
Preheating	90 to 150	<150
Dwelling	255 to 290	3 to 10

Recommended Hand-Soldering Parameters

Item	Condition
Temp. of Solder Head	350 °C (max.)
Soldering Time	4 seconds (max.)

Packaging Information

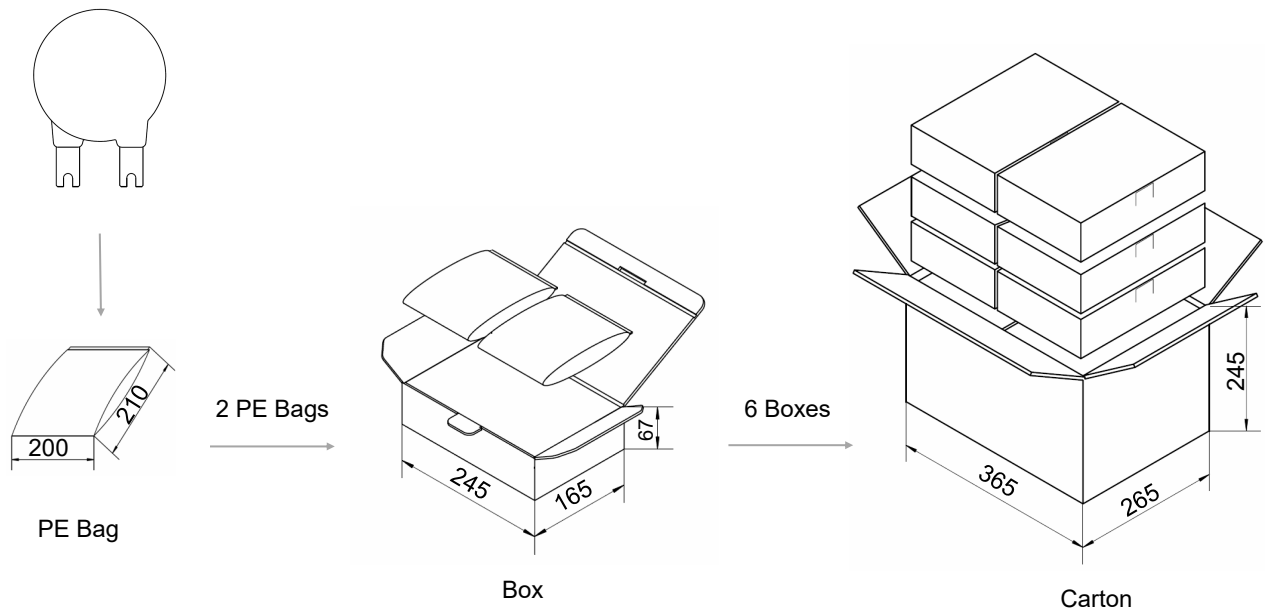
- Bulk Packaging (Code: BUL)
- Bulk Packaging Quantity & Weight.

Series	Nominal Varistor Voltage	PE Bag	Box	Carton	G. W / Carton (365 × 265 × 245)
	(V)	(PCS)	(PCS)	(PCS)	(kg)±10%
53D	820 - 221	25	50	600	11 - 24
	241 - 431	20	40	480	14 - 22
	471 - 751	15	30	360	15 - 23
	821 - 122	10	20	240	16 - 24

Note:

Other lead length packaging information, please contact SETsafe | SETfuse.

All Dimensions in mm





ATTENTION

MOV

MOV

Usage

1. Varistor must operated in the specified ambient temp.
2. Do not clean the varistor with strong polar solvent such as ketone, esters, benzene and halogenated hydrocarbon.
3. Please do not apply severe vibration, shock or pressure to MOV.
4. Please fix lead wires when bending or cutting. The distance between the bending point and the sealing of MOV shall be greater than 2 mm.

Replacement

If varistor is visually damaged, please replace it.

Storage

1. Storage Temp. Range: (-40 to +125) °C
2. Relative Humidity : ≤75% RH
3. Altitude: <2000 m
4. Do not store the MOV at the high temp., high humidity or corrosive gas environment, to avoid influencing the solder-ability of the lead wires, the product shall be used up within 1 year after receiving the goods.

Environmental Conditions

1. Varistor should neither be exposed to the open air, nor direct sunshine.
2. Varistor should avoid rain, water vapor or other condition of high temp. and high humidity.
3. Varistor should avoid sand dust, salt spray, or other harmful gases.

Max. Typical Capacitance of Varistor

The typical capacitance of varistor is listed in the specifications. Designers may refer to it when designing MOV in high frequency circuit.

Installation

Mechanical Stress

Do not knock MOV when installing, to avoid mechanical damage.